DOCUMENT RESUME

ED 194 619 TM 800 750

AUTHOR Lamb, Richard R.: Prediger, Dale J.
TITLE Criterion-Related Validity of Sex-Restrictive and Unisex Interest Scales: A Comparison.
INSTITUTION American Coll. Testing Program, Iowa City, Iowa. Research and Development Div.
PUB DATE 20 Oct 78
NOTE 32p.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Career Choice; College Bound Students; College Seniors; *Culture Fair Tests; Higher Education; High Schools; High School Seniors; *Interest Inventories; *Majors (Students); Sex Bias; *Sex Differences; Sex Fairness
IDENTIFIERS *Act Interest Inventory; Unisex Edition of ACT Interest Inventory IV

ABSTRACT

Two studies are described which compare the criterion-related validity of sex-balanced (unisex) interest inventory scales, for example, scales designed such that the distributions of scores are similar for males and females, and traditional, sex-restrictive scales. Approximately 1,600 college-bound high school seniors (study 1) and 2,000 college seniors (study 2) completed both the ACT Interest Inventory (ACT-IV) and the new Unisex Edition of the ACT-IV (UNIACT), which contains sex-balanced items. In both studies, each participant was placed in one of six criterion groups based on the correspondence of expressed occupational choice (study 1) and actual college major (study 2) to Holland types. Comparable levels of criterion-related validity were obtained with the unisex scales, sex-restrictive scales, and with sex-balanced scores obtained by the traditional procedure of using same-sex norms. Study results and the results of previous research indicate that psychometrically sound interest inventories can be constructed with sex-balanced items, and that counselors may use inventories which provide sex-balanced score reports without sacrificing validity. (Author/MH)

Criterion-related Validity of Sex-restrictive and Unisex Interest Scales: A Comparison

Richard R. Lamb and Dale J. Prediger

Research and Development Division

American College Testing Program

Address: American College Testing Program
P. O. Box 168
Iowa City, Iowa 52240

Running head: Unisex Interest Scales

Date submitted: October 20, 1978

Abstract

This report describes two studies comparing the criterion-related validity of sex-balanced ("unisex") interest inventory scales--i.e., scales designed such that the distributions of scores are similar for males and females--and traditional, sex-restrictive scales. Approximately 1,600 college-bound high school seniors (Study 1) and 2,000 college seniors (Study 2) completed both the ACT Interest Inventory (ACT-IV) and the new Unisex Edition of the ACT-IV (UNIACT), which contains sex-balanced items. In both studies, each participant was placed in one of six criterion groups based on the correspondence of expressed occupational choice (Study 1) and actual college major (Study 2) to Holland types. Comparable levels of criterion-related validity were obtained with the unisex scales, sex-restrictive scales, and with sex-balanced scores obtained by the traditional procedure of using same-sex norms. Study results and the results of previous research indicate that (a) psychometrically sound interest inventories can be constructed with sex-balanced items, and (b) counselors may use inventories which provide sex-balanced score reports without sacrificing validity.

Criterion-related Validity of Sex-restrictive and Unisex Interest Scales: A Comparison

Tittle and Zytowski (in press) estimate that 3,500,000 persons take machine-scored interest inventories each year; undoubtedly millions more take hand-scored inventories. Many of these inventories (e.g., the Strong-Campbell Interest Inventory) assess basic dimensions of interest (e.g., mechanical, artistic, enterprising), the focus of this paper. As noted below, the distributions of basic interest scores provided to males and females, as groups, may be either similar or widely divergent and sex stereotypic, depending upon the scales and score reporting procedures that are used. This is of no small consequence considering the number of inventories administered each year and the potential influence of score reports on the career plans of males and females.

If the reports for traditional interest inventories assessing general interests simply provide raw scores, currently a popular reporting procedure, the distribution of scores provided to males and females, as groups, will be dramatically different. As a result of sex differences in responses to individual items, males, on the average, receive higher scores on scales assessing interest in scientific, technical, and business management activities; females, on the average, receive higher scores on scales assessing interest in social service, office/clerical, and artistic activities (Cole & Hanson, 1975; Gottfredson, Holland, & Gottfredson, 1975; Prediger & Hanson, 1977). Because raw scores provide divergent, sex-stereotypic occupational suggestions to males and females, as groups, they have been termed "sex-restrictive" (Prediger & Hanson, 1974).

As illustrated by Cole and Hanson (1975), score reports based on combined-sex norms also result in sex-restrictive interest profiles. Such norms merely indicate a person's ranking on each scale relative to the norming population. If females have low raw scores compared with males on a given scale, they also will have low normed scores compared to a norm group based on males and females combined. This, in turn, will lead to sex-restrictive norm-based score reports similar to those provided by the raw scores.

In contrast, males and females receive similar, "sex-balanced" score reports if the reports are based on same-sex norms. The norming process itself assures that males and females, as groups, will obtain the same standard score means and standard deviations on a given scale. Thus, when same-sex norms are used, similar proportions of males and females receive reports suggesting technical occupations, artistic occupations, etc. Cole and Hanson (1975) and Gottfredson, et al. (1975) provide data illustrating this point.

Another reporting procedure is also possible and commonly employed--the use of opposite-sex norms. In this procedure, which has been advocated by the U.S. Office of Civil Rights ("Separate Sex Norms", 1976), to supplement information provided by reports based on same-sex norms, norms established for males are used with females, and vice versa. However, for basic interest scales this method has been shown to provide even more divergent career suggestions to males and females than those provided by raw scores and combined-sex norms (Prediger, 1976). On the Strong-Campbell Interest Inventory (SCII) occupational scales, opposite-sex norms are used routinely in reporting male-scale scores for females and female-scale scores for males (Campbell, 1977).

Johnson (1977) has shown that this procedure "reinforces sexual stereotypes. Both sexes scored relatively high on cross-sex scales representing 'traditional' occupations for their sex and relatively low on scales representing 'nontraditional' occupations" (p. 239).

The possible social implications of providing divergent, sex-stereotypic interest score reports to males and females are apparent, and the issue has been widely debated in the literature. It has been argued that sex differences in raw scores simply reflect underlying sex differences in basic vocational interests and, hence, sex-restrictive reports are necessary to maximize validity (e.g., see Gottfredson & Holland, 1975, in press; Gottfredson, et al., 1975). However, several recent studies offer evidence that sex-balanced score reports are at least as valid as sex-restrictive reports (e.g., see Hanson, Noeth, & Prediger, 1977; Prediger & Hanson, 1977, 1978). Hanson, Prediger, and Schussel (1977) summarize the results of these and several other studies bearing on this issue.

Sex differences in the interest scores provided by the different reporting procedures (and the resulting controversy) stem from sex differences in item responses. However, these differences are observed on only about half of the items on traditional interest inventories (Campbell, 1977; Harmon, 1975; Johansson, 1976). Stated another way, about half of the items on traditional inventories are sex-balanced. The obvious implication is the possibility of creating an inventory consisting entirely of sex-balanced items. Such an inventory could provide sex-balanced score reports using a single set of combined-sex norms. It would also comply with NIE Guidelines for Assessment of Sex Bias and Sex Fairness in Career Interest Inventories (Diamond, 1975),

which recommend that inventory items be sex-balanced by scale insofar as possible.

The primary purpose of this study was to compare the criterion-related validity of a recently developed interest inventory based on sex-balanced "unisex" items with that of a traditional interest inventory assessing the same basic interests. A finding that unisex scales constructed with sex-balanced items can be as valid as traditional scales assessing the same interest dimensions could have far-reaching implications for the field of interest assessment. In addition, such a finding would lend support to other studies (see summary by Hanson et al., 1977) suggesting that the vocational interests of males and females are much more similar than raw scores on current inventories would indicate.

The research reported here represents both a replication and an extension of work begun by Hanson and Rayman (1976). In a validity study using the occupational preferences of 1,380 college-bound students as the criterion, Hanson and Rayman compared an experimental interest inventory containing unisex scales with a traditional inventory containing sex-restrictive scales. Both instruments assessed the six interest types described by Holland (1973). The criterion-related validities of the two types of scales were nearly identical.

The current investigation, which is based on two separate studies, used a substantially refined unisex interest inventory with improved psychometric characteristics. In addition, better definition of criterion group status was achieved through use of college seniors (Study 2) as well as college-bound students (Study 1), and more readily understood validation procedures were

employed. Validity indices included interest scale means and high-point code hit rates for criterion groups classified by Holland type. Finally, validity comparisons with sex-balanced scores based on same-sex norms are also reported.

Procedure

Instruments

The ACT Interest Inventory (ACT-IV), a 90-item, 6-scale inventory assessing the six interest types described by Holland (1973), was used in both studies to obtain sex-restrictive score reports based on raw scores and opposite-sex norms. Sex-balanced score reports based on same-sex norms, the normal reporting procedure for the ACT-IV, were also obtained. Coefficient alpha estimates of reliability of the ACT-IV range from .88 to .94 for men and from .87 to .93 for women. A detailed description of the ACT-IV is provided by Hanson (1974). Hanson, et al. (1977) summarize criterion-related validity data for 152 educational, occupational membership, and vocational choice criterion groups (N = 26,656).

Score reports based on unisex scales were provided by UNIACT, the Unisex Edition of the ACT-IV. This new inventory also contains 90 items, and the six scales were designed to parallel those on the ACT-IV. Development originated in work by Rayman (1976) and was followed by six sequential studies (N = 10,388) leading to UNIACT (Hanson, et al., 1977). Of the 90 UNIACT items, 72 (80%) are sex-balanced, using as a criterion a difference of 10% or less between the percentage of males and females responding "like" to an item. (In contrast, only 38% of the items on the ACT-IV meet this criterion.) Of the remaining 18 UNIACT items, 61% are answered "like" more frequently by females than males.

Strong (1955, p. 22) suggested that two distributions differ in meaningful ways if overlap is less than 80% based on Tilton's (1937) measure. As shown by Prediger (Note 1), interest scale overlap of less than 80% for males and females is common for widely used interest inventories. In one case, overlap was as low as 32%. Overlap of the scores of males and females in the UNIACT national norm group ranges from 85% to 99%. The range for the ACT-IV is 57% to 98%, and the overlap for three of the scales is less than 80%. Since males and females receive similar scores on UNIACT, combined-sex norms can be used to report results without introducing sex restrictiveness. (Norms are needed to facilitate the comparison of scores across scales.)

Coefficient alpha reliabilities for UNIACT range from .85 to .92, values comparable to those reported above for the ACT-IV. Hanson, et al., (1977) provide additional information on the construction and psychometric characteristics of this instrument including construct validity and correlations of the scales with the corresponding ACT-IV scales.

Study 1 Sample and Analyses

The target sample of 2,013 individuals was selected from approximately 127,000 college-bound students who registered for the October 1977 ACT Assessment Program (AAP) national test date. Only those high school seniors who (a) completed UNIACT as part of the registration packet, (b) planned to enroll in college the following fall, and (c) were "fairly sure" or "very sure" of their vocational choice were eligible for the study. The sample was selected from the resulting pool on the basis of the general correspondence of expressed vocational choice, as recorded on the AAP registration sheet, to the six Holland types. In order to assure the adequate representation

of each Holland type, a stratified random sample was drawn. Approximately equal numbers of males and females were selected for each Holland type (i.e., criterion group) with some oversampling in the artistic and realistic categories to fulfill data collection requirements of a planned follow-up study.

UNIACT and the ACT-IV, combined on a single form for the purposes of this study, were mailed to the target sample. Instructions requested that the completed inventories be returned by mail, and promised a personalized, computer-printed score report. Half of the sample received forms with UNIACT items appearing first, and half received forms with ACT-IV items appearing first. Reminder postcards were mailed to the entire sample, and duplicate follow-up materials were mailed to non-responders 19 days after the initial mailing. Completed inventories were returned by 1,589 individuals, 79% of the target sample.

Students in the final sample were reallocated to Holland types (i.e., criterion groups) on the basis of their planned occupational choice using the classification system and associated alphabetical index provided by Holland (1972). Some shifts in initial assignments were made in order to achieve close correspondence with Holland's classification system.

Following the model used by Walsh and his students (Fishburne & Walsh, 1976; Horton & Walsh, 1976; Matthews & Walsh, 1978; O'Brien & Walsh, 1976) with predefined criterion groups, interest scale means were calculated for each group. According to Holland's (1973) theory of careers, the scale with the highest mean should correspond to the Holland type for the criterion

group. Correspondence of highest scale score mean to criterion group type was determined separately for males and females for each of four score reporting procedures--two sex-restrictive procedures (ACT-IV raw scores and ACT-IV standard scores based on opposite-sex norms) and two sex-balanced reporting procedures (ACT-IV standard scores based on same-sex norms and UNIACT standard scores based on combined-sex norms). UNIACT and ACT-IV standard scores were based on norms derived from national samples independent of the study samples.

As another indicator of criterion-related validity, criterion group "hit rates" were calculated separately by sex for each of these four reporting procedures. A "hit" was tallied for a given reporting procedure when a student's criterion group membership corresponded with his or her high point code (highest interest score). All score ties were broken randomly in determining high point codes.

Study 2 Sample and Analyses

The target sample for Study 2 was selected from the roster of seniors enrolled in 1977-78 at 16 major universities. These institutions, which were located in 15 states representing primarily the midwestern, southern, and southwestern regions of the country, were selected on the basis of geographical diversity and because they had a high percentage of ACT-tested freshmen in 1974-75. (The latter consideration was relevant because this study was conducted concurrently with an ACT-IV longitudinal study involving the same institutions.)

Each participating institution provided computer tapes containing registration records for its senior class, including the institution's code for each

senior's current (1977-78) academic major. To establish equivalence of academic majors across institutions, the Higher Education General Information Survey (HEGIS) coding system (Huff & Chandler, 1970) was used to recode each institution's academic major codes.

Once again, a stratified random sample was drawn. The sampling plan involved the random selection of 300 college seniors (150 males and 150 females) within each of 10 broad fields of study (e.g., engineering, art, physical sciences) chosen to span Holland's types. In March and April of 1978, both UNIACT and the ACT-IV, on a single form, were mailed to 2,999 students in the target sample with instructions requesting that completed inventories be returned by mail. The cover letter promised a score report of current interests for all participants and a report comparing 1973 scores with current scores for the 2,096 individuals having 1973 scores. Half of the sample received forms with UNIACT items appearing first, and half received forms with ACT-IV items appearing first. Reminder postcards were mailed to the entire sample a few days after the initial mailing, and duplicate follow-up materials were mailed two to three weeks later to non-responders. A final set of materials was mailed to the permanent home address of each non-responder, if it was different from the local address, after classes had dismissed for the summer. Completed inventories were returned by 1,988 seniors. Excluding from the target sample 94 individuals whose materials were returned as undeliverable, a response rate of 68% was achieved.

As noted above, the target sample consisted of seniors majoring in ten broad fields of study. For establishing criterion groups, however, a more

precise coding system was employed. With a few exceptions, the HEGIS code for each of the students was assigned to a Holland type using the index cited in Study 1. The exceptions involved 26 students with HEGIS codes in general agriculture and the "other" category in engineering. Because these majors lacked clear definition as to Holland type, records for these 26 students were excluded from the analysis. Analyses were conducted exactly as in Study 1.

Results

The correspondence between highest scale score mean (high point code) and the Holland type associated with each criterion group is shown in Table 1 for the various reporting procedures. In Study 1, for example, the unisex

---

Insert Table 1 about here

---

scale means for males in the investigative criterion group were as follows: Investigative, 56.3; Artistic, 47.9; Social, 46.1; Enterprising, 46.6; Conventional, 49.0; Realistic, 51.3. Because the Investigative Scale mean was highest, an "I" is shown in Table 1 in the cell corresponding to the investigative criterion group (column) and unisex scales (row). In this case the scale with the highest mean was appropriate to the criterion group.

The number of inappropriate high point codes combined across the two studies provides a basis for comparing the criterion-related validity of the four reporting procedures. When opposite-sex norms were used with males, 5 of 12 high-point codes (6 codes per study) were inappropriate; there was but

one other inappropriate code for males. For females use of opposite-sex norms and raw scores each resulted in four inappropriate codes; use of same-sex norms and unisex scales each resulted in one inappropriate code. Thus, validity as determined by this criterion was lower for both sexes using opposite-sex norms, and for females using raw scores. There was little difference among the remaining procedures.

Hit rate data for both studies are summarized in Tables 2 and 3.

Insert Tables 2 and 3 about here

The unweighted average hit rates shown at the bottom of the tables are the means of the hit rates for each of the six criterion groups. This method of summarizing hit rate results has been used in several recent studies (e.g., see Hanson, Noeth, & Prediger, 1977; Hanson & Rayman, 1976; Prediger & Hanson, 1977) and, as discussed by Prediger (1977) and Prediger and Cole (1975), is consistent with counseling uses of interest scores. Following the lead of Strong (1955), all criterion groups are treated as if they were of equal size and importance. It should be emphasized that the studies were, indeed, designed to validate counseling uses of the interest scores rather than to predict criterion group status. As Berdie (1970) has noted, few counselors are interested in predicting a counselee's occupation or occupational preference. The validation model used here asks whether members of a given criterion group would have been referred to that group by their interest results.

For standard scores based on unisex scales, the average hit rate for males was 44% in Study 1 and 46% in Study 2; for females these values were 34% and 46%,

respectively. Hit rates for the other two reporting procedures summarized in Tables 2 and 3--raw scores and same-sex standard scores--were comparable to these values. The overall hit rates for males and females in Study 1 differed somewhat; however, the male and female criterion groups were not comparable in either study due to differences in the mix of occupational preferences (Study 1) and college majors (Study 2) associated with a given Holland type. Thus, male-females comparisons are not warranted. In Study 1, the range of hit rates for the three reporting procedures was 3 and 4 percentage points for males and females, respectively; in Study 2, the corresponding values were 4 and 2 percentage points. From a practical standpoint, the variations in hit rates are relatively minor. Results for none of the three reporting procedures were clearly and consistently superior.

Not shown in Tables 2 and 3, due to space limitations, are hit rates based on standard scores derived from opposite-sex norms. For females the unweighted average hit rates for this reporting procedure, 38% in Study 1 and 44% in Study 2, were within the range of unweighted average hit rates for the other reporting procedures. For males, however, these values, 39% in Study 1 and 43% in Study 2, were lower than the hit rates for the three other reporting procedures.

Discussion

Of the various reporting procedures compared, criterion-related validity (as indicated by high-point codes and hit rates) was generally lowest for standard scores based on opposite sex norms, a finding consistent with results reported by Hanson, et al. (1977). Results for the other three reporting procedures indicate that there are no consistent, dramatic differences in

criterion-related validity. Although high point code comparisons suggested that validity was lowered when raw scores were used with females, only inconsequential differences in hit rates occurred. In previous comparisons of sex-balanced and sex-restrictive reporting procedures based on traditional interest scales (Hanson, et al., 1977; Prediger & Hanson, 1977), the hit rates for sex-balanced reporting procedures averaged about 3 percentage points higher for males and 7 percentage points higher for females. Results from the current study together with results from the previous studies strongly suggest that the sex-restrictive reporting procedures cannot be justified as a necessary concomitant of validity. The use of same-sex norms with traditional interest inventories provides a viable option to sex-restrictive score reports based on raw scores or combined-sex norms. As noted above, males and females receive similar interest profiles and career suggestions when same-sex norms are used.

When an interest inventory is constructed to provide sex balance at the item level, the data again indicate that sex differences in interest scores are not a necessary concomitant of validity. The unisex scale validity data were comparable to the data obtained for sex-restrictive reports. This finding is consistent with that reported by Hanson and Rayman (1976) using a precursor of UNIACT and a different, more complex, validation technique (discriminant analysis and centour scores). Results from the present investigation and the Hanson-Rayman study illustrate that sex differences in vocational interest scores can be appreciably reduced, if not totally eliminated, merely by careful item construction.

Additional support for the criterion-related validity of unisex scales is provided in a recent study by Wallace (1978) in which UNIACT was administered to 1,400 college seniors in 24 majors. Using multiple discriminant analysis with the six unisex scales as independent variables, Wallace found good differentiation among the majors. Discriminant function scale loadings paralleled those obtained for the ACT-IV using national data (Hanson, 1974), and the score profiles for the majors made good sense. Wallace also found that congruence between a student's UNIACT profile and major was significantly greater ($p.<01$) for students expressing satisfaction versus dissatisfaction with their major.

The hit rates for unisex scales reported in the present study are similar to the hit rates obtained by Osipow and Ashby (1968) in a study of the relationship between Vocational Preference Inventory (VPI) high-point codes and the educational preferences of 670 entering college males. The educational preferences, which were obtained at the time the VPI was administered, were grouped into Holland's six types. The unweighted average hit rate for the six criterion groups formed in this manner was 41%. It is not clear whether same-sex norms were used in reporting VPI results, although this is the common reporting procedure (Holland, 1965, 1975). In a more recent study, Gottfredson and Holland (1975) report Self-Directed Search raw score hit rates for 702 college males grouped into Holland's six types according to occupational preference. The unweighted average hit rate was 34%, which is substantially lower than the hit rates obtained for males in this study. However, occupational preference was recorded 3 years after the SDS administration; hence,

a lower hit rate would be expected. (See also Holland and Lutz, 1968.) Comparative data for females based on criterion groups representing all six Holland types are not available in these studies.

In a concurrent validity study involving occupational criterion groups, Salomone and Slaney (1978) administered the Vocational Preference Inventory to 470 male and 447 female "nonprofessional level" workers. Apparently VPI raw scores were used in obtaining Holland high point codes. All six of Holland's occupational categories were represented for both males and females. The average criterion group hit rate for males was 34%, substantially lower than the average unisex scale hit rates obtained for males in the present investigation. For females, the average hit rate was 37%, a value similar to that obtained in Study 1 but substantially lower than that obtained in Study 2. However, lower hit rates might be expected in the Salomone-Slaney study since criterion group classification was determined by an individual's actual job title and duties. In the present investigation, criterion group assignments were based on educational major and occupational preference, both of which may be less subject to the influence of factors (e.g., economic) extraneous to interests. In a similar study involving a broader sample of occupations, Hughes (1972) administered the VPI to 400 adult males and determined high-point code hit rates for current occupations classified by Holland type. The overall hit rate averaged 43%, which is similar to the unisex scale hit rates obtained in the current study. It is not clear whether VPI normed scores or raw scores were used.

Findings from the current study and previous studies of unisex scales and sex-balanced reporting procedures make it difficult to accept an argument that the observed sex differences in raw scores on traditional interest inventories necessarily reflect "real" differences in the vocational interests of males and females. A hypothesis consistent with the available evidence is that the largest component of apparent sex differences on traditional interest inventory scales is linked to irrelevant sex-role connotations in the items (e.g., "Would you like to operate a power shovel?" "Repair a hot rod?" "Tend babies?"). Thus, the vocational interests of males and females may not be nearly as divergent as some have maintained. The implications for vocational psychology should be readily apparent.

For researchers developing new interest inventories, the finding that sex-balanced scales constructed with sex-balanced items are as valid as traditionally constructed scales is particularly significant. Much of the concern about use of sex-balanced score reports based on same-sex norms appears to result from the feeling that same-sex norms "treat males and females differently." This concern is not a problem when sex-balanced reports are achieved through unisex scales since combined-sex norms can be used. Through careful selection of items, it should be possible to develop sex-balanced basic interest scales for other interest inventories. Sex-balanced occupational scales for instruments such as the SCII may also be possible. Work so far has focused on the elimination of potentially biased items from existing scales (Hansen, 1976; Johnson, in press). The validity of the shortened scales has been slightly lower than that of full length scales. Perhaps, it will be

possible to construct full-length scales based on sex-balanced items and maintain validity equal to that of the current scales. If so, the need for separate-sex scales and norms would be eliminated. As Harmon (1975) has suggested, one set of scales and norms could then be used with both males and females.

For counseling practitioners, results from this investigation and previous research on this topic have implications regarding a choice they must make. Interest inventories providing sex-restrictive reports tend to limit the career exploration of counselees to occupations traditional to the counselee's sex. For women, particularly, limiting exploration in this manner is problematic, as the traditionally female occupations tend to have lower pay, less responsibility, and less status. Interest inventories providing sex-balanced reports, in contrast, encourage clients to explore a full range of appropriate career options, including those which are nontraditional for the counselee's sex. Both types of inventories are readily available. The research evidence suggests that counselors need not be concerned that they are sacrificing validity in the interest of equality by choosing an interest inventory which provides sex-balanced reports.

Reference Note

1. Prediger, D. J. Basic vocational interest scales: The problem of sex restrictiveness and alternatives. Paper presented at the meeting of the American Psychological Association, Toronto, August 1978.

References

Berdie, R. F. Vocational choice studies. Personnel and Guidance Journal, 1970, 48, 604-605.

Campbell, D. P. Manual for the Strong-Campbell Interest Inventory (2nd ed.). Stanford, Calif.: Stanford University Press, 1977.

Cole, N. S., & Hanson, G. R. Impact of interest inventories on career choice. In E. E. Diamond (Ed.), Issues of sex bias and sex fairness in career interest measurement (National Institute of Education Report). Washington, D.C.: U.S. Government Printing Office, 1975.

Diamond, E. E. (Ed.). Issues of sex bias and sex fairness in career interest measurement (National Institute of Education Report). Washington, D.C.: U.S. Government Printing Office, 1975.

Fishburne, F. J., Jr., & Walsh, W. B. Concurrent validity of Holland's theory for non-college-degreed workers. Journal of Vocational Behavior, 1976, 8, 77-84.

Gottfredson, G. D., & Holland, J. L. Vocational choices of men and women: A comparison of predictors from the Self-Directed Search. Journal of Counseling Psychology, 1975, 22, 28-34.

Gottfredson, G. D., & Holland, J. L. Toward beneficial resolution of the interest inventory controversy. In C. K. Tittle & D. G. Zytowski (Eds.), Sex-fair interest measurement: Research and implications (National Institute of Education Report). Washington, D.C.: U.S. Government Printing Office, in press.

Gottfredson, G. D., Holland, J. L., & Gottfredson, L. S. The relation of vocational aspirations and assessments to employment reality. Journal of Vocational Behavior, 1975, 7, 135-148.

Hansen, J. C. Exploring new directions for Strong-Campbell Interest Inventory Occupational Scale Construction. Journal of Vocational Behavior, 1976, 9, 147-160.

Hanson, G. R. Assessing the interests of college youth: Summary of research and applications (ACT Research Report No. 67). Iowa City, Iowa; American College Testing Program, 1974.

Hanson, G. R., Prediger, D. J., & Schussel, R. H. Development and validation of sex-balanced interest inventory scales (ACT Research Report No. 78). Iowa City, Iowa: American College Testing Program, 1977.

Hanson, G. R., & Rayman, J. Validity of sex-balanced interest inventory scales. Journal of Vocational Behavior, 1976, 9, 279-291.

Hanson, G. R., Noeth, R. J., & Prediger, D. J. Validity of diverse procedures for reporting interest scores: An analysis of longitudinal data. Journal of Counseling Psychology, 1977, 24, 487-493.

Harmon, L. W. Technical aspects: Problems of scale development, norms, item differences by sex, and the rate of change in occupational group characteristics. In E. E. Diamond (Ed.), Issues of sex bias and sex fairness in career interest measurement (National Institute of Education Report). Washington, D.C.: U.S. Government Printing Office, 1975.

Holland, J. L. Manual for the Vocational Preference Inventory. Palo Alto, Calif.: Consulting Psychologists Press, 1965.

Holland, J. L. Professional manual for the Self-Directed Search. Palo Alto, Calif.: Consulting Psychologists Press, 1972.

Holland, J. L. Making vocational choices: A theory of careers. Englewood Cliffs, N.J.: Prentice-Hall, 1973.

Holland, J. L. Manual for the Vocational Preference Inventory. Palo Alto, Calif.: Consulting Psychologists Press, 1975.

Holland, J. L., & Lutz, S. W. The predictive value of a student's choice of vocation. Personnel and Guidance Journal, 1968, 46, 428-434.

Horton, J., & Walsh, W. B. Concurrent validity of Holland's theory for college degreed working women. Journal of Vocational Behavior, 1976, 9, 201-208.

Huff, R. A., & Chandler, M. O. A taxonomy of instructional programs in higher education (U.S. Department of Health, Education, and Welfare). Washington, D.C.: U.S. Government Printing Office, 1970.

Hughes, H. M. Vocational choice, level, and consistency: An investigation of Holland's theory on an employed sample. Journal of Vocational Behavior, 1972, 2, 377-388.

Johansson, C. B. Manual for the Career Assessment Inventory. Minneapolis: National Computer Systems, 1976.

Johnson, R. J. A "unisex" occupational scale for the Strong-Campbell Interest Inventory. Applied Psychological Measurement, in press.

Johnson, R. W. Relationships between female and male interest scales for the same occupations. Journal of Vocational Behavior, 1977, 11, 239-252.

Matthews, D. F., & Walsh, W. B. Concurrent validity of Holland's theory for non-college-degreed working women. Journal of Vocational Behavior, 1978, 12, 371-379.

O'Brien, W. F., & Walsh, W. B. Concurrent validity of Holland's theory for non-college degreed black working men. Journal of Vocational Behavior, 1976, 8, 239-246.

Osipow, S. H., & Ashby, J. D. Vocational Preference Inventory high point codes and educational preferences. Personnel and Guidance Journal, 1968, 47, 126-136.

Prediger, D. J. Contradictory results predicted. Guidepost, September 9, 1976, p. 2.

Prediger, D. J. Alternatives for validating interest inventories against group membership criteria. Applied Psychological Measurement, 1977, 1, 275-280.

Prediger, D. J., & Cole, N. S. Sex-role socialization and employment realities: Implications for vocational interest measures. Journal of Vocational Behavior, 1975, 7, 239-251.

Prediger, D. J., & Hanson, G. R. The distinction between sex restrictiveness and sex bias in interest inventories. Measurement and Evaluation in Guidance, 1974, 7, 96-104.

Prediger, D. J., & Hanson, G. R. Some consequences of using raw score reports of vocational interests. Journal of Educational Measurement, 1977, 14, 323-333.

Prediger, D. J., & Hanson, G. R. Must interest inventories provide males and females with divergent vocational guidance? Measurement and Evaluation in Guidance, 1978, 11, 88-98.

Rayman, J. Sex and the single interest inventory: The empirical validation of sex-balanced interest inventory items. Journal of Counseling Psychology, 1976, 23, 239-246.

Salomone, P. R., & Slaney, R. B. The applicability of Holland's theory to nonprofessional workers. Journal of Vocational Behavior, 1978, 13, 63-74.

Separate sex norms usage must meet OCR Regulations. Guidepost, July 1976, p. 12.

Strong, E. K., Jr. Vocational interests 18 years after college. Minneapolis: University of Minnesota Press, 1955.

Tilton, J. W. Measurement of overlapping. Journal of Education Psychology, 1937, 28, 656-662.

Tittle, C. K., & Zytowski, D. G. (Eds.). Sex-fair interest measurement: Research and implications (National Institute of Education Report). Washington, D.C.: U.S. Government Printing Office, in press.

Wallace, D. L. A validation study of the unisex form of the ACT Interest Inventory at the University of Southern Mississippi. Unpublished doctoral dissertation, University of Southern Mississippi, 1978.

Table 1

Interest Scale (Holland Type) on Which Criterion Groups Obtained Highest Mean Score

Reporting procedure	Male criterion group[a]						Female criterion group[a]					
	I	A	S	E	C	R	I	A	S	E	C	R
Study 1--college-bound students												
Unisex scales	I	A	S	E	C	R	$\overline{IAC}$	A	S	E	C	$\overline{IR}$
Same-sex standard scores	I	A	S	E	C	R	I	A	S	E	C	R
Opposite-sex standard scores	R[b]	R[b]	R[b]	$\overline{ER}$	C	R	A[b]	A	S	$\overline{SEC}$	C	A[b]
Raw scores	I	A	S	E	C	R	S[b]	$\overline{AS}$	S	S[b]	$\overline{SC}$	S[b]
Study 2--college seniors												
Unisex scales	I	A	$\overline{AS}$	E	C	$\overline{IR}$	I	A	$\overline{AS}$	E	C	I[b]
Same-sex standard scores	I	A	A[b]	E	C	R	I	A	A[b]	E	C	R
Opposite-sex standard scores	$\overline{IR}$	A	R[b]	E	R[b]	R	A[b]	A	$\overline{AS}$	E	C	$\overline{IA}$[b]
Raw scores	I	A	S	E	$\overline{EC}$	R	I	A	S	E	C	I[b]

Note. A dash over two codes indicates that the corresponding means differed by one-tenth of a standard deviation or less. Tables providing mean scale scores for each reporting procedure are available from the senior author.

[a]Abbreviations for Holland types corresponding to scales and criterion groups are: I, Investigative; A, Artistic; S, Social; E, Enterprising; C, Conventional; R, Realistic.

[b]Inappropriate code.

Table 2

Hit Rate Percentages for College-bound Students (Study 1)

Criterion group[a]	Males				Females			
	ACT-IV				ACT-IV			
	N	Raw scores	Same-sex standard scores	Unisex scales	N	Raw scores	Same-sex standard scores	Unisex scales
Investigative	187	50	40	43	181	28	32	22
Artistic	142	40	55	45	187	46	41	48
Social	76	54	41	29	132	62	26	29
Enterprising	124	44	37	41	145	22	34	31
Conventional	101	50	69	64	132	42	62	51
Realistic	107	42	36	41	75	9	35	23
Unweighted average hit rate		47	46	44		35	38	34

Note. Data for opposite-sex standard scores are summarized in the text.

[a]Students were allocated to Holland types on the basis of their occupational preferences.

Table 3

Hit Rate Percentages for College Seniors (Study 2)

Criterion group[a]	Males				Females			
		ACT-IV				ACT-IV		
	N	Raw scores	Same-sex standard scores	Unisex scales	N	Raw scores	Same-sex standard scores	Unisex scales
Investigative	323	59	46	53	348	49	50	55
Artistic	148	62	79	63	188	60	57	61
Social	151	41	30	27	182	56	24	32
Enterprising	121	57	62	56	121	36	43	46
Conventional	105	31	47	42	118	51	55	61
Realistic	81	37	33	33	76	9	47	22
Unweighted average hit rate		48	50	46		44	46	46

Note. Data for opposite-sex standard scores are summarized in the text.

[a] Students were allocated to Holland types on the basis of their college majors.